ATTACHMENT 9-1

An excursion corrective action report will be submitted to the State of Texas two weeks after initial excursion confirmation. The report will include measures taken in the previous two weeks and planned corrective measures to be taken in the following month. Such reporting will continue until water quality values are below upper control limits specified under 4.8.1.

4.9 Restoration

4.9.1 Description of Process

Restoration of the production zone will be achieved by reverse osmosis (R.O.) treatment. As discussed earlier in this Chapter, 200 gallons per minute of groundwater will be extracted from the mined zone. This water will be pumped through the ion exchange facility where residual uranium is extracted, and the groundwater will be processed by R. O. treatment. Following R. O. treatment there will be two grades of water, product or deionized water and reject or brine. The deionized water will be reinjected into the mined zone at a rate of 133 gallons per minute which will enhance restoration directly by sweeping the wellfields. The brine will be disposed of by deep well injection.

4.9.2 Reverse Osmosis Operation Principles

Osmosis is a natural process that occurs in all living cells. With an appropriate semi-permeable membrane as a barrier to solutions of differing concentrations, naturally occurring osmotic pressure forces pure water from the dilute solution to pass through the membrane and dilute the more concentrated solution. This process will continue until an equilibrium exists between the two solutions.

Reverse osmosis (R.O.) is a reversal of the natural osmotic process. By applying an opposite pressure greater than the natural occurring osmotic pressure on water containing dissolved solids, the majority of this water is passed through the membrane resulting in the concentration of the original solution. The membrane rejects the passage of the majority of the dissolved solids while concurrently permitting the passage of water.

Reverse osmosis has been evolving since its inception during the mid-sixties. Originally, very high pressures were needed to produce water of sufficient quantity and quality which translated into exorbitant electrical costs. However, with the advent of Thin Film Composite membranes, the required pressures needed to sustain commercial operations have been greatly reduced. On this basis alone, there has been a resurgence of interest in utilizing reverse osmosis for most water purification projects.

URI plans to utilize spiral wound polyamide thin film composite membranes or equivalent for the Vasquez solution mining project. These membranes were selected primarily due to their inherent rejection characteristics for the full range of dissolved solids and low pressure operating requirements. Spiral wound membranes have a greater ability to flush particulates through to brine (i.e. non-fouling) unlike their predecessor, the hollow filament membranes which were easily plugged by precipitates and other micron size debris.

- Chloride -

Anion exchange species for the uranyl tricarbonate complexed anion is chloride. Chloride concentrations exchanged into aquifer mine fluids cause buildup of chloride in the production zone. These concentrations may exceed baseline by a factor of three. Therefore, chloride increases in monitor wells to levels well above baseline would indicate the possibility of an excursion.

- Uranium -

Economic in situ leach operations require that uranium concentrations in production solutions must exceed baseline condition by at least two or more orders of magnitude. Therefore, uranium concentration significantly exceeding baseline conditions would be an excellent indicator of possible mine fluid excursion.

Production and non-production zone monitor wells will be sampled every two weeks coincident with discontinuous water level measurements. All samples will be analyzed within 24 hours and recorded within three days on appropriate forms. If any one sample has a chemical level quality or species above a predetermined level, a verifying analysis will be performed. If the results of the verifying analysis are above upper control limits it will be assumed that an excursion has occurred. These levels are:

Conductivity: Maximum Baseline (umhos) + 25%
Chloride: Maximum Baseline (mg/l) + 25%
Uranium: Baseline + 5 mg/l

These levels are the maximum concentrations for the production zone aquifer plus deviation for laboratory error. All monitor well analysis data will be kept on site for inspection and will be reported to the State of Texas monthly on prescribed forms.

4.8.2 Corrective Action Measures

If abnormal formation pressuring occurs without attendant chemical increases in the monitor wells, corrective action will consist of greater bleed stream extraction. If one or more monitor wells have chemical levels exceeding the excursion determining threshold a second sample will be taken within 24 hours of the initial sampling. If analysis of the second sample shows that the chemical levels of the first were the result of improper sampling, faulty analysis or similar phenomena, no further action will be taken. If the second analysis produces results substantiating the first one, the TNRCC will be so notified by telephone within one working day and by written communication within two working days of confirmation.

Simultaneously, operations will increase the bleed extraction and continue monitoring the affected well(s) every other day until the monitor well values of conductivity, chloride and uranium are below excursion threshold values, and values consistent with current local baseline water quality as confirmed by three consecutive daily samples for the control parameters.

In-Situ Uranium Mining Application Technical Review
Notice of Deficiency
Vasquez Permit No. URO 3050

The Texas Natural Resource Conservation Commission (TNRCC) staff has received and reviewed URI's application for an in-situ uranium mining permit. Our review of these documents shows that insufficient information was presented to demonstrate compliance with Title 30 Texas Administrative Code (TAC) Section § 331.122. The following is necessary to continue the review of your application.

10. In Section 4.9.2, page 41, identify the source of the "post-mining fluids".

Response:

"Post mining fluids", as used in the second paragraph on page 41 refers to the ground water in the mine zone that was utilized in the leaching process and resulted in the elevation of certain inorganic chemical parameters. These chemical parameters require reduction via the reverse osmosis restoration program to assure compliance with 331.107.

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11. The proposed restoration table, Table 4, does not contain the full range of constituents in the mine area aquifer. Add any missing constituent to the table including Fluoride, pH, and the ones in your Table 5.

Response:

URI has revised Table 4 and Table 5 and include the revision in Attachment 11-1.

ATTACHMENT 11-1

Table 4 Primary Restoration Parameter

Ca	CO_3	Ec @ 25 C
Mg	HCO_3	
Na	SO_4	
K	CL	pH

If the wellfield value for each chemical parameter is consistent with baseline quality, restoration is considered to be completed.

At such time, the state will be notified and a time selected for split sample collection. Three sample sets will be taken at one month intervals from the original baseline wells. Providing no significant changes exist between the first two analyses, the third sample set will be analyzed for the minor and trace constituents originally reported (Table 5). If the major and minor constituents reported for all three sample sets are within the restoration limit, restoration is complete and no further obligation for continued subsurface restoration is required.

Table 5 Minor and Trace Restoration Parameter

Fluoride	As	Mo
Nitrate	Cd	Hg
S_1O_2	Fe	Se
TDS	Pb	U
Alkalinity	Mn	Ra-226
Ammonia		

If restoration efforts are initiated and are ongoing and the values of the parameters describing water quality have stabilized for a period of 180 days, and the ground water would be suitable for any use to which it was reasonably suited prior to mining, negotiation will be conducted with the TNRCC to discuss if restoration is complete.

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12. In Section 4.9.5, Restoration Processes, § 331.107 requires a stabilization period of 180 days (e).

Response:

The revision in Attachment 11-1 has a stability period of 180 days indicated.

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13. In Section 13.1, Closing Class III Wells, include the weight of drilling mud to be used and the length of the surface cement plug.

Response:

Attached, please find an amended version of Section 13.0. URI does not propose to plug with mud. All wells will be cement plugged from TD to surface.

ATTACHMENT 13-1

13.0 CLOSING

All surface acreage affected by Vasquez mining activities will be restored to a land use condition as good as, or identical, with pre-mining land use. Exception to this would be any prior surface restoration agreement with the land owner and/or any restoration condition imposed by the State of Texas. Basic closing procedures are outlined below.

13.1 Class III Wells

After aquifer restoration has been accomplished, all lateral and master manifold pipelines will be removed from the property. Lines that are not reusable will be decontaminated and disposed of by salvage, sale or destruction. Salvageable lines will be held for use in other in-situ leach activities. All wellhead equipment, i.e., valves, meters, control panels, etc., will be salvaged or destroyed in a like manner.

All production, injection, and monitor wells will be plugged and abandoned by filling the well bore entirely with cement from TD to surface. The casing will then be cut at the top of the cement and the upper three feet will be pulled. The resulting hole will be backfilled with native soil. One exception could possibly be made to this procedure. If the landowner should desire to leave a well or wells open, it will be done after informing the landowner of the water quality of the well(s). Such action will be taken after informing the State of Texas.

13.2 Surface Plant

All surface structures will be removed from the property after mining activity has ceased. Tanks, lines, pumps and structural steel will be disposed of in a manner similar to that for wellfield equipment. Concrete pads will be decontaminated by acid scrubbing, demolished and disposed of in an appropriate solid waste facility.

All fluids held in waste retention ponds will be evacuated and disposed by deep well injection. Any remaining solid waste will either be solubilized and injected as above, or drummed and shipped to a licensed 11.e.2 byproduct disposal site. Thereafter, the pond liner will be decontaminated, folded and placed in the bottom of the pond. Two feet of impermeable clay will be placed on top of the liner. Pond embankments will then be placed over the clay and graded to a crown in order that water will not be impounded on the pond site. This surface will be seeded with grass to preclude erosion.

Power poles, phone lines and other equipment will be retained at the discretion of the landowner. Office and maintenance structures will be removed and stored for further use.

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14. Provide maps of proposed Production Areas and monitor well locations, §§ 331.122(A) and (K).

Response:

Proposed monitor well locations are illustrated within Attachment 1-1.

Actual locations will be modified and be presented as part of the application for appropriate Production Area Authorization.

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15. Furnish maps and cross-sections showing the vertical and lateral limits of aquifers in the AOR with less than 3,000 mg/l TDS and of aquifers with less than 10,000 mg/l TDS, §§ 331.122(C).

Response:

Drill hole data, within the 1/4 mile area of review, which penetrates the clay underlying the production zone is limited.

Oil and gas logs are presented in Cross Sections A-A', B-B', Figures 33 and 34, respectively. On Cross Section A-A', the Hamen & Cox Alonzo Taylor No. 1 is inside the area of review to the east. This hole shows the Catahoula Sand Member at a depth from the surface of 860 feet. On Cross Sections B-B', the Henshaw Brothers Alonzo Taylor No. 1 is just outside the area of review to the northeast. This well shows the top of the Catahoula Sand at 900 feet from the surface with the bottom at approximately 1,375 feet from the surface.

The configuration of the resistivity on these logs indicates water quality which is similar to the overlying production zone; the Oakville Formation. Underlying sands, i.e., the Frio Formation, contain saline water with TDS in excess of 10,000 mg/l.

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16. Provide the source of the injection fluids, §§ 331.122 (F) (iii).

Response:

All injection fluid will be circulated ground water derived from the mine zone. The ground water will be fortified with oxygen and carbonate, if necessary. While this liquid is commonly referred to as lixiviant, it is essentially the natural ground water from the area.

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17. Supply a description of expected changes in pressure, native fluid displacement, and direction of movement of injection fluid, § 331.122(L).

Response:

As specified in Section 4.8.1 of the Technical report and illustrated in Figure 21 of that report, the proposed Vasquez mine will be operated with a net of over-production of 1%. In other words, only 99 percent of the produced water will be reinjected back into the mine zone. This will cause a negative pressure anomaly in the mine zone as compared to the surrounding area, and cause natural formation water to migrate into the mine zone in response to this negative pressure anomaly.